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ABSTRACT

This paper argues that the socio-economic transformation caused by the 1971 Suki Agricultural project in central eastern Sudan has had contradictory effects on children. The Suki Agricultural Project was expected to transform the rural economy from production for consumption to production for exchange and profit. Ten years after the project's initiation, 10-year-old children were observed for their roles in agricultural production and their provision of subsistence within the household and their acquisition of knowledge and skills. Since the 1971 project changed production and reproduction as well as the local ecology, the project required greater labor contributions from children. Deforestation associated with the project meant that children had to spend more and more time collecting less and less accessible firewood, while the rise of the cash economy turned wood and water into commodities and increasingly involved children not only in their procurement but their sale. These activities, along with the production and sale of other commodities such as garden produce and charcoal, and including their own labor, left the children little time for play or formal education. The future for these rural children included: (1) labor migration of males from the village; (2) low job skills resulting from little formal education; (3) decline in rural productivity; (4) women taking a more active role in agricultural production; and (5) an adult population unable or unwilling to carry out the production tasks from the Suki Agricultural Project. An 11-item bibliography is included. (DJC)

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Children's Environmental Learning, Knowledge and Interactions Under Conditions of Socio-Economic Transformation: The Possibilities of Change

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A child is perched precariously atop a donkey laden with a sack of sorghum seeds a digging stick and a couple of hoes. She steadies herself and rides surely along the canals as the sun rises. It takes nearly an hour to reach her family's field. She and her brother and sister will spend the morning planting part of their family's ten acre farm tenancy in sorghum while their father clears the irrigation ditches nearby. Punctuating their work at irregular--and to their father annoying--intervals, this girl and her brother will set up a homemade net trap in an unsuccessful attempt to ensnare some of the birds which descend on the area during the rainy season. On other days they may succeed in trapping a dozen or more small birds which the boy will kill following Islamic practice and the children's mother or older sisters will cook for a family meal. School is out during the rains, mainly to allow teachers to return home from rural areas which become inaccessible and difficult to live in during this time. Partly by design, but mostly by coincidence, this schedule also allows all children, including students, to assist their households with the heavy burdens of agricultural work. As the children make their way to the fields they cross paths with a number of herdboys leading flocks of small animals out to pastures just turning green with the arrival of the rains.

This narrative drawn from a year of geographic field research in rural Sudan suggests the importance of and variation in children's environmental interactions in an agrarian community. What children learn about the environment and how they use this knowledge in their work and play are fundamental cultural forms and practices, shared in a social matrix and bearing a specific relationship to the prevailing social relations of production and reproduction. My hypothesis was that in an agriculturally based economy, learning about the environment--about farming, animal husbandry and the use of local resources--would be an aspect of children's socialization that was essential to maintaining and reproducing the society. Moreover, as is documented amply in the literature (e.g., Rodgers and Standing, 1981; Michaelson, 1981; Tienda, 1979; Nag et al., 1978; Mascarenhas, 1977; and Caldwell, 1977) children's work participation in these settings often is fundamental to the daily maintenance of their households, and thus the community as a whole. Children's environmental interactions, then, were understood as central not only to the activities of production but also to the daily reproduction of their households; and their environmental learning and knowledge were considered as crucial to the long term maintenance of the socio-economic system itself.

This paper is based on an ethnographic study of these phenomena under conditions of profound socio-economic and cultural-ecologic change engendered by incorporation in a state-sponsored agricultural development project. The research was undertaken in Howa[1], a village

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[1] The name of the village and its inhabitants have been changed to protect the privacy of research participants.

in central eastern Sudan included in the Suki Agricultural Project in 1971, ten years prior to my study. It drew on a branching sequence of ethnographic methods designed to elicit information on the content and organization of children's environmental knowledge and to discover the means of its acquisition and use. These methods included participant observation, child-led walks, an exercise combining environmental modeling and geo-dramatic manipulation, ethnosemantic and other open-ended interviews, and a village-wide household survey. The goals of my research were three-fold; (1) to discover and document both the activities through which children acquired and used environmental knowledge, and the content and organization of that knowledge; (2) to examine these as cultural forms and practices, that is, in dynamic articulation with the labor process and the social relations that underlie it; and (3) to describe, and if possible analyze, how children's environmental learning, knowledge and interactions appeared to be changing in relation to the larger social, economic and environmental changes taking place. This paper will argue that under these circumstances of socio-economic transformation, what children learn about the environment and how they acquire and use that knowledge can have contradictory effects not only upon the children as they come of age but on the outcome of the social change itself.

Howa was a farming community. Virtually all of the major activities undertaken to produce or procure either the means of existence or household income involved environmental interaction. As in most such communities in the Third World, children figured prominently in these activities whether they were undertaken on a subsistence or income producing basis. My research suggested that participation in work varied depending on the nature of the task or set of tasks. That is, children's participation in work that was subsistence oriented was influenced more readily by individual demographic characteristics such as gender, birth order position and age, while participation in activities related to the accumulation of wealth or undertaken for exchange was determined to a greater degree by socio-economic factors such as household status or father's occupation.

My observations of ten year old children in Howa indicated that they contributed importantly to the main income producing activities there--agriculture and animal husbandry. In particular, ten year old children participated significantly in planting, weeding and harvesting their families' fields, and many boys of this age (approximately 20% overall) worked as herdboys guiding their households' flocks daily. Perhaps even more importantly, children in Howa contributed centrally to a range of subsistence tasks involving environmental interaction. They played a central role in the provision of domestic water supplies, in collecting or cutting fuelwood for their households and in gathering food and other resources from the local environment. (They were also significant in a range of other tasks important to household maintenance, but my focus on environmental interaction precluded addressing these activities, such as cooking, child care and cleaning, systematically.) It should be noted that Howa was an Islamic community in which a moderate form of purdah, the seclusion of women was

practiced. Thus, children's work there was of heightened significance because many of the tasks that are the responsibility of women elsewhere in Africa, such as procuring water and wood, generally fall to them.

Given that most of the work of production and reproduction in Howa centered on manipulating the local environment, the tasks of children generally required the use of environmental knowledge of various degrees of complexity and sophistication. Not surprisingly then, as is often the case in such settings, learning about the environment was an important component of children's upbringing in Howa (cf. Ruddle and Chesterfield, 1977; Modiano, 1973; Middleton, 1970; Raum, 1940; Wisner, 1970). In general, children in Howa learned about agriculture, animal husbandry and the use of natural resources largely in the course of their work and play. Direct instruction by older children or adults was often an integral part of the process of children's work. My research presented clear evidence that in 1981 these activities of work, play and learning were relatively unified in the lives of children in Howa. Indeed, in the literature on children's learning in settings characterized by similar socio-economic conditions, the integrity between instruction and practice is referred to repeatedly. So too is the easy back and forth between work and play in the course of children's learning.

The major themes developed in the literature on children's learning in non-industrialized economies were borne out by my study as well. First, children learned about the environment and its use largely in the context of their participation in the work and other practices of their community as these took place in their customary settings. Second, children's work was often fused with play in time, space and meaning. Finally, children's play itself was often a creative means for the acquisition, use and consolidation of environmental knowledge. These findings were illustrated in the introduction to this paper. When a child assists her family with planting sorghum and then runs off with her brother to trap birds she is both working and playing, and in this case both activities have environmental content.

My research revealed many instances in which children's work and play were intertwined, offering grounded opportunities both to acquire and use environmental knowledge. For example, several children in Howa played an elaborate socio-dramatic modeling game called "fields" in which they undertook in miniature the full range of activities associated with agriculture from seed preparation to harvest, storage and marketing. For some children this was a chance to reinforce what they had learned during work and other expeditions to the fields, and to experiment, on a manageable scale, with coordinating work activities in which they participated piecemeal as assistants or apprentices in a larger family enterprise. For other children, the game of "fields" was part of an introduction by slightly older friends to the agricultural practices of their community. In a similar vein, children who assisted their fathers with the production of charcoal occasionally constructed

miniature charcoal kilns in which a small amount of usable fuel was produced. Adults in Howa, as elsewhere, recognized that in these and myriad other play activities children learned, practiced and reinforced environmental knowledge and skills.

The general hypothesis that guided this work from the outset was that a change in the production system, such as was caused by incorporation in the Suki Agricultural Project, would alter the settings and activities for reproducing that production system. The settings of particular concern for this project on children's environmental knowledge and learning were the household, the peer group and the school or other sites of formal training. Accordingly, the activities of particular interest were children's work, play and formal learning. The category of reproduction was understood as physical--encompassing both biological reproduction and the appropriation and/or production of means of subsistence adequate to ensure the daily maintenance of the population; and socio-cultural--reproducing the conditions of life and labor, in which the skills and knowledge associated with social production figure prominently. Given this construction, my research addressed children's roles in production and the provision of subsistence, and their acquisition of the knowledge and skills necessary to maintain the system of production and reproduction over time.

By the time of my research in 1981, the state-sponsored agricultural development project established in 1971 had altered not only the social relations of production and reproduction, but the local ecology as well. These transformations, in turn, had led to conditions which changed the nature of children's interactions with the environment as well as the means and content of their environmental learning. My initial hypothesis was that as a result of the socio-economic changes underway in Howa, children would begin to attend school more frequently, resulting in their participating less in the work of their households. By extension, I thought that the decline in children's work would begin to erode the traditional relationship between their work and play, and in turn, the experience of the two as a means of environmental learning. While this relationship was indeed being eroded, the reasons for it were quite different, revealing some of the contradictions which inhere in socio-economic and cultural change. These contradictions suggest the indeterminate nature of change and raise the possibility of resistance or re-creation in the face of change imposed from the outside. Their substance as it affected children's environmental learning, knowledge and interactions is discussed next.

Incorporation in the Suki Agricultural Project transformed the local economy from one geared largely to production for consumption to one based on production for exchange and ultimately the accumulation of profit. This transformation propelled socio-economic differentiation in Howa, exacerbating previously existing differences between households' earnings and assets as it created new ones. Because it altered people's relationship to the primary productive resource in the

area--land--the Project also led to changes in the class relations and socio-economic status of the population of Howa. It also altered the local environment fundamentally and had a marked effect on human-land relations in the area. The shift in control over approximately 2,500 acres bordering the village from traditional land-use patterns, with access determined within the community, to the irrigated cultivation of cash crops carried out as part of a state-sponsored agricultural development effort, has had a pronounced effect on forestry resources, grazing resources and the practice of alternative methods of agriculture in the area. Prior to 1971 Howa was characterized by a pattern of mixed land-use in which the dryland cultivation of sorghum and sesame left adequate grazing and wood resources in the fallow and uncultivated areas around the village.

All of these changes had a marked effect on children's lives, and of particular concern in this study, on the production and exchange of local knowledge. Rather than increasing school enrollment and children's play time, however, the changes wrought by the agricultural project seemed to demand greater labor contributions from children than previously had been the case. The reasons for this were threefold; the higher labor demands associated with the irrigated cultivation of cotton and groundnuts compared with the rainfed cultivation of sorghum and sesame, the environmental changes brought about by the irrigation project, and the increased need for cash engendered by incorporation in the agricultural development project and the global cash economy which it represents.

According to adults in Howa interviewed about the changes taking place as a result of the agricultural project, the demands of cultivating cotton and groundnuts as cash crops exceed those associated with the rainfed cultivation of sorghum and sesame that had prevailed before 1971. They noted that in addition to the labor demands of irrigation and the use of fertilizers, pesticides and herbicides, Project authorities required four weedings of each crop with a hoe that was more difficult and tiresome to use than customary tools. These labor demands were met with the increased use of family labor, especially children. In many tenant households, particularly those of lower socio-economic status, children were kept from school enrollment or forced to drop-out because their families needed them to help with the full range of agricultural tasks which took place during the school year.

Another reason that children's work in Howa had increased was found in the environmental changes which had taken place in the area as a result of the irrigation project. The most striking change was the deforestation that had resulted from the land-use shifts associated with the Project. The traditional system of mixed land-use, combining subsistence dryland agriculture and the raising of small animals, left adequate wooded areas to meet local needs. In 1970-71, 2,500 acres of the most arable land around the village were cleared to create 250 farm tenancies. (This was part of a larger process in which 85,000 acres were cleared in the area to establish the Suki Agricultural Project.)

While there were scattered rows of trees between farmers' tenancies, the amount woodland in the vicinity of the village was severely curtailed by the Project. This change forced villagers to meet their needs for cooking fuel and construction materials by clearing other areas around the village. By 1981 there were few trees apart from ornamentals within a half-hour's walk from the village, and most of the trees within an hour's walk were less than five centimeters in diameter. This situation led to general increases in the time required to procure household fuel supplies. In Howa, where many aspects of fuel provision were the responsibility of children, these changes led to substantial increases in children's work time. Not only did they have to go further afield to collect or cut fuelwood, but the poor quality and small size of most of what was available increased the number of trips per week necessary to provide adequate wood for domestic consumption.

Finally, children's work had increased because of the larger economic changes associated with the introduction of the agricultural project. Not only did the project bring about enormous changes in production relations in Howa, but it heightened the integration of the village into the national cash economy. With the establishment of the Project, access to many goods that had been commonly held or freely available was restricted. For example, of particular relevance to the question of children's labor, as indicated above, the process of land allocation associated with the agricultural project restricted the wooded areas nearby. As wood products became more difficult to procure by household labor, some wealthier families began to purchase them rather than rely on the increased labor of their children. Members of less fortunate households began to provide wood for sale. In this way a freely held good gradually becomes a commodity. As more freely held goods become commodities, the need for cash increases. By 1981, this process was well underway in Howa. It was compounded by an explosion in the number of merchants and traders there since 1971. Their presence introduced an increasingly wide array of consumer goods to villagers.

The ascendence of the cash economy in Howa often led to increases in children's work. In many households, children were needed to earn money to help meet the growing needs for cash. Moreover, the process of commoditization in Howa was affecting two resources that children were significant in procuring--wood and water. When families sought new means to earn cash it often fell to children to fetch water or cut wood for sale. In fact, most of the tasks in which children in Howa could earn money involved environmental interaction. Apart from the sale of wood and water, ten year old children helped to produce charcoal which their fathers sold in nearby towns, harvested vegetables from family garden plots and hawked these in the village, and worked as hired help in the agricultural tenancies of other village households. In these ways, the increased needs for cash created by the agricultural project and the cash economy which it represented, led to increases in the environmentally oriented work of children in Howa.

These shifts in children's work had consequences for the relationship between work and play, and for the nature of these as means for the acquisition and use of environmental knowledge. Moreover, the increased demands for children's labor in Howa limited the gains in school enrollment originally expected. (In 1981, 42% of the boys and 4% of the girls seven to twelve years old were enrolled in the village school.) There was even evidence, although not conclusive, that per capita school enrollment may have declined since the village was included in the Suki Agricultural Project. The implications of these changes were likely to be significant both for the children as they came of age and for the socio-economic formation of Sudan as a whole. A discussion of these concludes the paper.

My research indicated that most ten year old children were learning the knowledge, skills and values necessary to reproduce the social relations of production that characterized their community in 1981. The increases in children's work noted above ensured that they were learning the environmental knowledge and practices associated with maintaining a farming community. However, given that the number of tenancies allocated to village households in 1971 was fixed, that the size of the average household includes five children, and that the ages of children and their parents are frequently in proximity, it was apparent that relatively few of those who were ten years old in 1981 would be likely to have access to a farm tenancy when they come of age in the 1990s. Thus, for the first time, much of what children in Howa played and worked at would not exist for them in the world of their adulthood.

The outcomes are different for males and females. Most of the boys will be marginalized as agricultural wage laborers or forced to seek non-agricultural work elsewhere, either in the Project headquarters nearby, in regional towns or in the urban centers further away. By contrast, girls were socialized largely to assume their mothers' roles. While women's roles were likely to be stable for a longer period than men's, it appeared likely that as men migrate from the area in search of labor, women will assume a larger role in agricultural production. While girls of ten years old participated extensively in certain agricultural tasks such as planting and harvesting, unlike boys they were inexperienced in the full range of tasks and were not taught the overall organization of agricultural production. Thus, these girls coming of age were likely to need knowledge they had not acquired fully in their childhoods.

This discontinuity between childhood environmental learning and adult opportunities is part of a process that, in effect, results in the wholesale deskilling and marginalization of rural populations such as those in the area of Howa. Given the general lack of formal schooling in Howa, which might offer the chance for 'reskilling,' there was little likelihood of most children finding other employment except at the lowest levels of skill requirements. Moreover, these discontinuities were not the same for all children. Many children for example did not have the opportunity to acquire particular skills and

knowledge because their households lacked land in the agricultural project. The traditional importance of practical experience in environmental learning, discussed above, suggests that children from non-tenant households lost much of the opportunity shared by tenants' children to acquire and use agricultural knowledge. Thus, certain children, by virtue of their parents' socio-economic status, will be less skilled in agriculture than many of their contemporaries. In this way, the process of socio-economic differentiation engenders further differentiation. My research revealed some of the mechanisms of this process in children's experience.

For the socio-economic formation of Howa the intertwined processes of deskilling and differentiation as they appeared to be taking place, may lead in the short-run to declines in rural productivity, and in the long-run, as discussed above, to an adult population unable or unwilling to carry out the tasks of production associated with the Suki Project. Rural productivity may decline as the changing relations of production and the ensuing redefinition of vocational skill dislocate the household as the center of production and reproduction. These dual dislocations have resulted historically in the depopulation of the household, first as waged work is found outside of the home and ultimately as children leave in growing numbers to attend school. As a result, less labor is available to the rural household to maintain previous levels of agricultural productivity. The process of labor migration was just beginning in Howa in 1981.

Finally, the increases in children's work in Howa altered the traditional relationship between work and play, and the balance between the two as means for the acquisition and use of environmental knowledge. This process appeared likely to continue for the future whether the work responsibilities of children continued to increase, or whether greater numbers began to attend school. When play and work are separated, play becomes trivialized as a "childish" activity in the eyes of adults. Discrete from work, play remains a central means by which children are socialized both in terms of mastering particular kinds of knowledge or skills, and internalizing cultural values and other principles. However, important though its socializing role may be, divorced from work, play is less grounded in the general experience of the community as a whole and thus comes to be viewed by the community as trivial. When play becomes isolated and trivialized as an activity <u>only</u> for children or as something adults do <u>only</u> in their time off from work, the peer group becomes less integral to the larger society because it is no longer a social setting in which work and play are united. This process suggests the loss of an important aspect of autonomous traditional culture.

This paper has examined children's environmental learning, knowledge and interactions as cultural forms and practices articulated dynamically with a specific production system in rural Sudan. In tracing some of the contradictory outcomes of this relationship as it undergoes transformation, its goal was to demonstrate not only the breadth and depth of children's environmental interactions, but also

the indeterminacy of socio-economic change. Most of the evidence presented indicates signs of rupture in the means by which children acquired and used environmental knowledge, and significant disjuncture between what children learned or did and what they were likely to need to know as adults. These changes were cast as part of a larger process of deskilling. However, in documenting some of the vitality and variation I discovered in the children's work, play and learning as material social practices, this text raises at least the possibility of resisting or subverting some of the changes imposed from the outside. In order for this to be accomplished, children and their elders would have to consciously appropriate the strength inherent in the production and exchange of knowledge. Re-turning it to their own interests--to steady themselves and ride surely along the canals as the sun rises.

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